

WHAT IS CLAIMED IS:

1. A microcavity OLED device comprising:

- (a) a substrate;
- (b) a bottom-electrode layer disposed over one surface of the substrate;
- (c) an organic EL element disposed over the bottom-electrode layer; and
- (d) a top-electrode layer disposed over the organic EL element,

wherein one of the electrode layers is semitransparent and reflective and the other one is essentially opaque and reflective, and wherein the thickness of the semitransparent electrode layer and the relative location of the light emitting layers are selected to provide a luminance output of the microcavity OLED device at least 1.25 times that of a similar top-emitting OLED device or at least 1.75 times that of a similar bottom-emitting OLED device using similar OLED materials and having a transparent electrode in place of the semitransparent electrode.

2. The microcavity OLED device claimed in claim 1 wherein one or both of the electrodes are metallic.

3. The microcavity OLED device claimed in claim 2 wherein metallic electrode(s) include metals or metal alloys selected from the group including Ag, Au, Al, and Mg.

4. The microcavity OLED device according to claim 2 wherein both of the metallic electrode layers are Ag and the thickness of the semitransparent electrode layer is between 10 nm and 30 nm.

5. The microcavity OLED device according to claim 2 wherein the metallic bottom-electrode layer is semitransparent and the light is emitted through the substrate.

6. The microcavity OLED device according to claim 5 wherein the device further includes a high index absorption-reduction layer disposed between the semitransparent metallic bottom-electrode layer and the substrate.

7. The microcavity OLED device according to claim 6 wherein the absorption-reduction layer has an index of refraction greater than 1.6.

8. The microcavity OLED device according to claim 6 wherein the thickness of the absorption-reduction layer approximately satisfies the equation

$$2n_A L_A + n_T L_T = (m_A + 1/2) \lambda$$

where n_A and L_A are the refractive index and the thickness of the absorption-reduction layer respectively, n_T and L_T are the real part of the refractive index and the thickness of the semitransparent metal electrode respectively, and m_A is a non-negative integer. It is preferred to have m_A as small as practical, usually 0 and typically less than 2.

9. The microcavity OLED device according to claim 5 wherein the device further includes a transparent conductive spacer layer disposed between the semitransparent metallic bottom-electrode layer and the organic EL element or between the organic EL element and the metallic top-electrode layer.

10. The microcavity OLED device according to claim 2 wherein the metallic top-electrode layer is semitransparent and the light is emitted through the semitransparent metallic top-electrode layer.

11. The microcavity OLED device according to claim 10 wherein the device further includes a high index absorption-reduction layer disposed over the semitransparent top-electrode layer.

12. The microcavity OLED device according to claim 11 wherein the absorption-reduction layer has an index of refraction greater than 1.6.

13. The microcavity OLED device according to claim 10 wherein the thickness of the absorption-reduction layer approximately satisfies the equation

$$2n_A L_A + n_T L_T = (m_A + 1/2) \lambda$$

where n_A and L_A are the refractive index and the thickness of the absorption-reduction layer respectively, n_T and L_T are the real part of the refractive index and the thickness of the semitransparent metal electrode respectively, and m_A is a non-negative integer. It is preferred to have m_A as small as practical, usually 0 and typically less than 2.

14. The microcavity OLED device according to claim 10 wherein the device further includes a transparent conductive spacer layer disposed between the reflective metallic bottom-electrode layer and the organic EL element or between the organic EL element and the metallic top-electrode layer.

15. The microcavity OLED device according to claim 2 wherein the bottom-electrode layer is the anode and the top-electrode layer is the cathode.

16. The microcavity OLED device according to claim 2 wherein the bottom-electrode layer is the cathode and the top-electrode layer is the anode.

17. The microcavity OLED device according to claim 2 wherein the bottom electrode is essentially opaque and reflecting and the OLED device is a top-emitting OLED device.

18. The microcavity OLED device according to claim 2 wherein the top electrode is essentially opaque and reflecting and the OLED device is a bottom-emitting OLED device.